Extron® Electronics
INTERFACING, SWITCHING AND DISTRIBUTION

User's Guide

MTP U R RSA SEQ, MTP U R RS SEQ, MTP U R RS, and MTP U R A

Mini Twisted Pair Universal Receivers

68-1367-01
Rev. B
09 08

Precautions

Safety Instructions • English

This symbol is intended to alert the user of important operating and maintenance (servicing) instructions in the literature provided with the equipment.

This symbol is intended to alert the user of the presence of uninsulated dangerous voltage within the product's enclosure that may present a risk of electric shock.

Caution

Read Instructions • Read and understand all safety and operating instructions before using the equipment.

Retain Instructions • The safety instructions should be kept for future reference.

Follow Warnings • Follow all warnings and instructions marked on the equipment or in the user information.

Avoid Attachments • Do not use tools or attachments that are not recommended by the equipment manufacturer because they may be hazardous.

Consignes de Sécurité • Français

Ce symbole sert à avertir l'utilisateur que la documentation fournie avec le matériel contient des instructions importantes concernant l'exploitation et la maintenance (réparation).

Ce symbole sert à avertir l'utilisateur de la présence dans le boîtier de l'appareil de tensions dangereuses non isolées posant des risques d'électrocution.

Attention

Lire les instructions• Prendre connaissance de toutes les consignes de sécurité et d'exploitation avant d'utiliser le matériel.

Conserver les instructions• Ranger les consignes de sécurité afin de pouvoir les consulter à l'avenir.

Respecter les avertissements • Observer tous les avertissements et consignes marqués sur le matériel ou présentés dans la documentation utilisateur.

Eviter les pièces de fixation • Ne pas utiliser de pièces de fixation ni d'outils non recommandés par le fabricant du matériel car cela risquerait de poser certains dangers.

Sicherheitsanleitungen • Deutsch

Dieses Symbol soll dem Benutzer in der im Lieferumfang enthaltenen Dokumentation besonders wichtige Hinweise zur Bedienung und Wartung (Instandhaltung) geben.

Dieses Symbol soll den Benutzer darauf aufmerksam machen, daß im Inneren des Gehäuses dieses Produktes gefährliche Spannungen, die nicht isoliert sind und die einen elektrischen Schock verursachen können, herrschen.

Achtung

Lesen der Anleitungen • Bevor Sie das Gerät zum ersten Mal verwenden, sollten Sie alle Sicherheits-und Bedienungsanleitungen genau durchlesen und verstehen.

Aufbewahren der Anleitungen • Die Hinweise zur elektrischen Sicherheit des Produktes sollten Sie aufbewahren, damit Sie im Bedarfsfall darauf zurückgreifen können.

Befolgen der Warnhinweise • Befolgen Sie alle Warnhinweise und Anleitungen auf dem Gerät oder in der Benutzerdokumentation.

Keine Zusatzgeräte • Verwenden Sie keine Werkzeuge oder Zusatzgeräte, die nicht ausdrücklich vom Hersteller empfohlen wurden, da diese eine Gefahrenquelle darstellen können.

Instrucciones de seguridad • Español

Este símbolo se utiliza para advertir al usuario sobre instrucciones importantes de operación y mantenimiento (o cambio de partes) que se desean destacar en el contenido de la documentación suministrada con los equipos.

Este símbolo se utiliza para advertir al usuario sobre la presencia de elementos con voltaje peligroso sin protección aislante, que puedan encontrarse dentro de la caja o alojamiento del producto, y que puedan representar riesgo de electrocución.

Precaucion

Leer las instrucciones • Leer y analizar todas las instrucciones de operación y seguridad, antes de usar el equipo.

Conservar las instrucciones • Conservar las instrucciones de seguridad para futura consulta.

Obedecer las advertencias • Todas las advertencias e instrucciones marcadas en el equipo o en la documentación del usuario, deben ser obedecidas.

Evitar el uso de accesorios • No usar herramientas o accesorios que no sean especificamente recomendados por el fabricante, ya que podrian implicar riesgos.

Warning

Power sources • This equipment should be operated only from the power source indicated on the product. This equipment is intended to be used with a main power system with a grounded (neutral) conductor. The third (grounding) pin is a safety feature, do not attempt to bypass or disable it.

Power disconnection • To remove power from the equipment safely, remove all power cords from the rear of the equipment, or the desktop power module (if detachable), or from the power source receptacle (wall plug).

Power cord protection • Power cords should be routed so that they are not likely to be stepped on or pinched by items placed upon or against them.

Servicing • Refer all servicing to qualified service personnel. There are no user-serviceable parts inside. To prevent the risk of shock, do not attempt to service this equipment yourself because opening or removing covers may expose you to dangerous voltage or other hazards.

Slots and openings • If the equipment has slots or holes in the enclosure, these are provided to prevent overheating of sensitive components inside. These openings must never be blocked by other objects.

Lithium battery • There is a danger of explosion if battery is incorrectly replaced. Replace it only with the same or equivalent type recommended by the manufacturer. Dispose of used batteries according to the manufacturer's instructions.

Avertissement

Alimentations• Ne faire fonctionner ce matériel qu'avec la source d'alimentation indiquée sur l'appareil. Ce matériel doit être utilisé avec une alimentation principale comportant un fil de terre (neutre). Le troisième contact (de mise à la terre) constitue un dispositif de sécurité : n'essayez pas de la contourner ni de la désactiver.

Déconnexion de l'alimentation• Pour mettre le matériel hors tension sans danger, déconnectez tous les cordons d'alimentation de l'arrière de l'appareil ou du module d'alimentation de bureau (s'il est amovible) ou encore de la prise secteur.

Protection du cordon d'alimentation • Acheminer les cordons d'alimentation de manière à ce que personne ne risque de marcher dessus et à ce qu'ils ne soient pas écrasés ou pincés par des objets.

Réparation-maintenance • Faire exécuter toutes les interventions de réparation-maintenance par un technicien qualifié. Aucun des éléments internes ne peut être réparé par l'utilisateur. Afin d'éviter tout danger d'électrocution, l'utilisateur ne doit pas essayer de procéder lui-même à ces opérations car l'ouverture ou le retrait des couvercles risquent de l'exposer à de hautes tensions et autres dangers.

Fentes et orifices • Si le boîtier de l'appareil comporte des fentes ou des orifices, ceux-ci servent à empêcher les composants internes sensibles de surchauffer. Ces ouvertures ne doivent jamais être bloquées par des objets.

Lithium Batterie • Il a danger d'explosion s'll y a remplacment incorrect de la batterie. Remplacer uniquement avec une batterie du meme type ou d'un ype equivalent recommande par le constructeur. Mettre au reut les batteries usagees conformement aux instructions du fabricant.

Vorsicht

Stromquellen • Dieses Gerät sollte nur über die auf dem Produkt angegebene Stromquelle betrieben werden. Dieses Gerät wurde für eine Verwendung mit einer Hauptstromleitung mit einem geerdeten (neutralen) Leiter konzipiert. Der dritte Kontakt ist für einen Erdanschluß, und stellt eine Sicherheitsfunktion dar. Diese sollte nicht umgangen oder außer Betrieb gesetzt werden.

Stromunterbrechung • Um das Gerät auf sichere Weise vom Netz zu trennen, sollten Sie alle Netzkabel aus der Rückseite des Gerätes, aus der externen Stomversorgung (falls dies möglich ist) oder aus der Wandsteckdose ziehen.

Schutz des Netzkabels • Netzkabel sollten stets so verlegt werden, daß sie nicht im Weg liegen und niemand darauf treten kann oder Objekte darauf- oder unmittelbar dagegengestellt werden können.

Wartung • Alle Wartungsmaßnahmen sollten nur von qualifiziertem Servicepersonal durchgeführt werden. Die internen Komponenten des Gerätes sind wartungsfrei. Zur Vermeidung eines elektrischen Schocks versuchen Sie in keinem Fall, dieses Gerät selbst öffnen, da beim Entfernen der Abdeckungen die Gefahr eines elektrischen Schlags und/oder andere Gefahren bestehen.

Schlitze und Öffnungen • Wenn das Gerät Schlitze oder Löcher im Gehäuse aufweist, dienen diese zur Vermeidung einer Überhitzung der empfindlichen Teile im Inneren. Diese Öffnungen dürfen niemals von anderen Objekten blockiert werden.

Litium-Batterie • Explosionsgefahr, falls die Batterie nicht richtig ersetzt wird. Ersetzen Sie verbrauchte Batterien nur durch den gleichen oder einen vergleichbaren Batterietyp, der auch vom Hersteller empfohlen wird. Entsorgen Sie verbrauchte Batterien bitte gemäß den Herstelleranweisungen.

Advertencia

Alimentación eléctrica • Este equipo debe conectarse únicamente a la fuente/tipo de alimentación eléctrica indicada en el mismo. La alimentación eléctrica de este equipo debe provenir de un sistema de distribución general con conductor neutro a tierra. La tercera pata (puesta a tierra) es una medida de seguridad, no puentearia ni eliminaria.

Desconexión de alimentación eléctrica • Para desconectar con seguridad la acometida de alimentación eléctrica al equipo, desenchufar todos los cables de alimentación en el panel trasero del equipo, o desenchufar el módulo de alimentación (si fuera independiente), o desenchufar el cable del receptáculo de la pared.

Protección del cables de alimentación • Los cables de alimentación eléctrica se deben instalar en lugares donde no sean pisados ni apretados por objetos que se puedan apoyar sobre ellos.

Reparaciones/mantenimiento • Solicitar siempre los servicios técnicos de personal calificado. En el interior no hay partes a las que el usuario deba acceder. Para evitar riesgo de electrocución, no intentar personalmente la reparación/mantenimiento de este equipo, ya que al abrir o extraer las tapas puede quedar expuesto a voltajes peligrosos u otros riesgos.

Ranuras y aberturas • Si el equipo posee ranuras o orificios en su caja/alojamiento, es para evitar el sobrecalientamiento de componentes internos sensibles. Estas aberturas nunca se deben obstruir con otros objetos.

Batería de litio • Existe riesgo de explosión si esta batería se coloca en la posición incorrecta. Cambiar esta batería únicamente con el mismo tipo (o su equivalente) recomendado por el fabricante. Desachar las baterías usadas siguiendo las instrucciones del fabricante.

Precautions

安全须知 • 中文

这个符号提示用户该设备用户手册中有重要的操作和维护说明。

这个符号警告用户该设备机壳内有暴露的危险电压，有触电危险。

注意

阅读说明书 • 用户使用该设备前必须阅读并理解所有安全和使用说明。

保存说明书 • 用户应保存安全说明书以备将来使用。

遵守警告 • 用户应遵守产品和用户指南上的所有安全和操作说明。

避免追加 • 不要使用该产品厂商没有推荐的工具或追加设备，以避免危险。

警告

电源 • 该设备只能使用产品上标明的电源。 设备必须使用有地线的供电系统供电。 第三条线（地线）是安全设施，不能不用或跳过。

拔掉电源 • 为安全地从设备拔掉电源，请拔掉所有设备后或桌面电源的电源线，或任何接到市电系统的电源线。

电源线保护 • 妥善布线， 避免被踩踏，或重物挤压。

维护 • 所有维修必须由认证的维修人员进行。 设备内部没有用户可以更换的零件。为避免出现触电危险不要自己试图打开设备盖子维修该设备。

通风孔 • 有些设备机壳上有通风槽或孔，它们是用来防止机内敏感元件过热。 不要用任何东西挡住通风孔。

锂电池 • 不正确的更换电池会有爆炸的危险。 必须使用与厂家推荐的相同或相近型号的电池。 按照生产厂的建议处理废弃电池。

声明

所使用电源为 A 级产品，在生活环境中，该产品可能会造成无线电干扰。在这种情况下，可能需要用户对其干扰采取切实可行的措施。

FCC Class A Notice

This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation. The Class A limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference, in which case the user will be required to correct the interference at his own expense.

NOTE *This unit was tested with shielded cables on the peripheral devices. Shielded cables must be used with the unit to ensure compliance with FCC emissions limits.*

Table of Contents

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Introduction

About this Manual

This manual details the installation and operation of the Extron MTP U R series of mini twisted pair universal receivers.

- MTP U R RSA SEQ mini twisted pair receiver with RS-232, audio, and skew equalization
- MTP U R RS SEQ mini twisted pair receiver with RS-232 and skew equalization
- MTP U R RS mini twisted pair receiver with RS-232
- MTP U R A mini twisted pair receiver with audio

In this manual the following terms are applicable:

- "transmitter" refers specifically to the MTP transmitter.
- "MTP U R" or "receiver" refers to any MTP U R model.
- "SEQ receiver" refers specifically to the MTP U R RS SEQ and MTP U R RSA SEQ receivers with skew equalization.

About the MTP Universal Receivers

Extron MTP U R RSA SEQ, MTP U R RS SEQ, MTP U R RS, and MTP U R A receivers are for long distance distribution of RGB, component (bi/tri level), S-video, or composite video signals over twisted pair cables. The receivers auto detect video formats and RS-232/audio signals, enabling the signal to be output on the appropriate rear panel connector (see table below). RS-232 serial communication, dual mono audio, and skew equalization, are available on some devices.

Feature	Connectivity	MTP U R RSA SEQ	MTP U R RS SEQ	MTP U R RS	MTP U R A
RGBHV, RGBS output	15-pin HD (1)	✔	✔	✔	✔
Y, R-Y, B-Y output	BNCs (3) or 15-pin HD(1)	BNCs	15-pin HD	15-pin HD	15-pin HD
S-video output	4-pin mini DIN (1)	✔	✔	✔	✔
Composite video output	BNC (1)	✔	✔	✔	✔
Dual Mono audio output	5-pin captive screw (1)	✔	✘	✘	✔
RS-232 connectivity	5-pin captive screw (1)	✔	✔	✔	✘
Level adjustment		✔	✔	✔	✔
Peaking adjustment		✔	✔	✔	✔
Skew adjustment		✔	✔	✘	✘

Figure 1 — MTP U R series features

The MTP U Rs are a part of the Extron VersaTools® line of basic distribution amplifiers, switchers, transmitters, receivers, and associated video accessories.

The MTP U R models receive signals (high resolution RGB video, bi-level or tri-level component video, S-video and composite video) on an RJ-45 connector over Extron's Enhanced Skew-Free™ A/V UTP cable, or over Category (CAT) 5/5e/6 shielded twisted pair (STP), unshielded twisted pair (UTP), or foil shielded twisted pair (FTP) cable.

The receivers are compatible with these transmitters/switchers/Da's:

- All MTP low resolution products when used in mono audio mode
- MTP T 15HD A • MTP T 15HD RS • MTP DA
- SW 2/4/6 MTP T 15HDA • MTPX

The receiver outputs the RGBHV and RGBS video on the 15-pin HD connector, Y, R-Y, and B-Y signals andcomposite on BNC connectors, and S-video on the 4-pin mini DIN connector. Units without the component BNC connectors can output component video on the 15-pin HD connector

NOTE *The video auto detection feature is sensitive to video signals with high levels and/or over peaked signals, which may result in video detection issues.*

RS-232 (serial) communications and audio signals are passed on 5-pole captive screw connectors.

RS-232 communication is bidirectional (default); the receiver is able to receive commands from the transmitter and pass RS-232 responses back to the transmitter. It also supports flow control (XON, XOFF).

NOTE *Hardware flow control is not supported.*

RS-232 supports full duplex and half duplex operation, and supports any baud rate up to 38,400 bps (up to 600 feet), data bits (5-8), parity (odd, even, or none), stop bits (1 or 2), and data format without configuration.

NOTE *Higher rates are possible, but performance will vary as a function of baud rate and TP cable length.*

The two SEQ receivers also correct the skew delay (misconvergence) commonly encountered when using CAT 5, CAT 5e, or CAT 6 TP cables for RGB and component video.

NOTE *An SEQ receiver should not be necessary when Extron Enhanced Skew-Free A/V UTP cable is used.*

The MTPs ship with external desktop 12 V, 2A power supplies that accept 100 to 240 VAC, 50 Hz or 60 Hz input.

TP cable advantages

Twisted pair cable is much smaller, lighter, more flexible, and less expensive than coaxial cable. These TP products make cable runs simpler and less cumbersome and termination with RJ-45 connectors is simple, quick, and economical.

Transmission distance

The maximum distance is determined by the frequency and resolution of the signal transmitted. The following table specifies the recommended maximum transmission distances and transmitter Pre-Peak switch positions using Extron Enhanced Skew-Free A/V UTP cable or UTP CAT 5/5e/6 cable, terminated with CAT 5 rated connectors.

Video format	Pre-Peak off	Pre-Peak on	Max. distance (high quality)	Max. distance (variable quality)
Composite, S-video, Component			800' (245 m)	1000' (300 m)
640 x 480	<300' (90 m)	>350' (105 m)	700' (215 m)	750' (240 m)
800 x 600	<300' (90 m)	>350' (105 m)	550' (165 m)	650' (200 m)
1024 x 768*	<300' (90 m)	>350' (105 m)	500' (150 m)	600' (185 m)
1280 x 960*	<300' (90 m)	>350' (105 m)	400' (120 m)	500' (150 m)
1280 x 1024*	<250' (75 m)	>300' (90 m)	350' (105 m)	450' (135 m)
1360 x 765	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
1365 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1366 x 768	<250' (75 m)	>300' (90 m)	400' (120 m)	450' (135 m)
1400 x 1050	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1440 x 900	<250' (75 m)	>300' (90 m)	350' (105 m)	400' (120 m)
1600 x 1200*	<250' (75 m)	>300' (90 m)	300' (90 m)	450' (135 m)
1920 x 1200	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 720p	<250' (75 m)	>300' (90 m)	400' (120 m)	500' (150 m)
HDTV 1080i	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)
HDTV 1080p	<250' (75 m)	>300' (90 m)	300' (90 m)	400' (120 m)

* same spec at 75 Hz

Figure 2 — Recommended transmission distances at 60 Hz

NOTE *It is possible to exceed the recommended distance; however, image quality may be reduced.*

NOTE

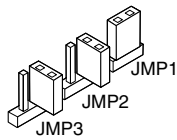
The transmitter and receiver are designed for and perform best with Extron Enhanced Skew-Free A/V cable terminated in accordance with the TIA/EIA T 568 A wiring standard. CAT 5 cables are acceptable but less preferable. We also recommend the use of pre-terminated and tested cables. Cables terminated on site should be tested before use to ensure that they comply with Category 5/5e/6 specifications.

The recommendations shown in the table apply for a single transmitter and receiver. For example, the maximum suggested range for 1024 x 768 video is 300' (90 m) with Pre-Peak off and 600' (150 m) with it on.

Receiver Jumpers

The MTP U R receivers have three jumpers on the main board. Jumper 1 (JMP1) controls RS-232 directional communication, and Jumpers 2 (JMP2) and 3 (JMP3) control vertical and horizontal sync respectively.

By default, JMP1 is closed on all models and configured to send serial data both ways (bidirectional), transmitter-to-receiver and receiver-to-transmitter. Jumpers 2 and 3 are open (negative sync) by default.



Default settings as viewed from rear

Setting JMP1 for RS-232 communication

Jumper 1 can be repositioned to enable unidirectional communication as follows:

1. If applicable, disconnect all cables, remove the receiver from its installation location, and remove any mounting brackets installed.
2. Remove the two screws from either side of the receiver (four screws total) and lift the top cover off of the receiver.
3. Locate jumper JMP1 on the main board. Remove and reposition it over one pin (see figure 3).

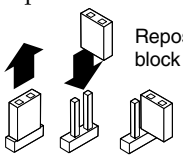


Figure 3 — Setting jumper 1 to uni-directional

4. Put the top cover back into place.
5. Reinstall the four screws removed in step **2**. If any mounting brackets were removed in step **1**, put them back into position as you reinstall the screws

6. If applicable, reinstall the receiver and reconnect all cables.

NOTE *Jumper 1 should be set to uni-directional when an MTP DA is installed as part of the system to avoid any RS-232 /Audio detection issues.*

When an MTP U R series receiver is used with an MTPX Matrix Switcher, it should be set to unidirectional for transmitter to receiver communication, otherwise it should be set to bi-directional when using the RS-232 output insert connections on the switcher.

Setting the jumpers to positive vertical and/or horizontal sync polarity

Jumper 2 is the controlling jumper for vertical sync, and Jumper 3 for horizontal sync. Jumpers 2 and 3 are to the left of Jumper 1, when viewed from the rear of the receiver. By default they are set to open (1 pin covered). They can be repositioned to invert vertical or horizontal sync as follows:

1. If the unit is not already open, follow steps **1** and **2** on the previous page to access the jumpers.
2. Locate JMP 2 and JMP 3 on the main board. Remove and reposition the jumper block over both pins (see figure 4).

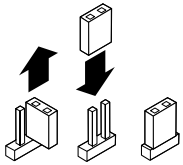


Figure 4 — Inverting sync with jumpers 2 and 3

3. Follow steps **4** through **6** on the previous page.

To reset the syncs to default, open the unit and turn the applicable jumper block to cover only a single pin, as desired.

Transmitter Jumper

When using the MTP T 15HD series products with the MTP U R, the bi/tri-level sync jumper on the transmitter should be set as follows when transmitting component video.

	480i	480p	576i	576p	720p	1080i	1080p
Bi-level	X	X	X	X			X
Tri-level					X	X	

Application Diagrams

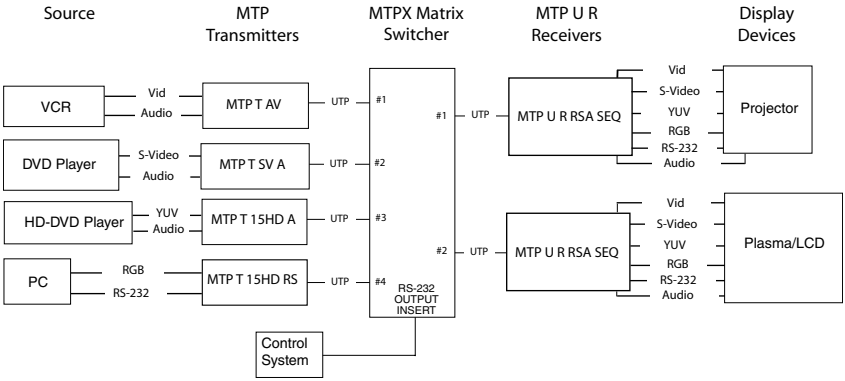


Figure 5 — MTP U R and MTPX switcher

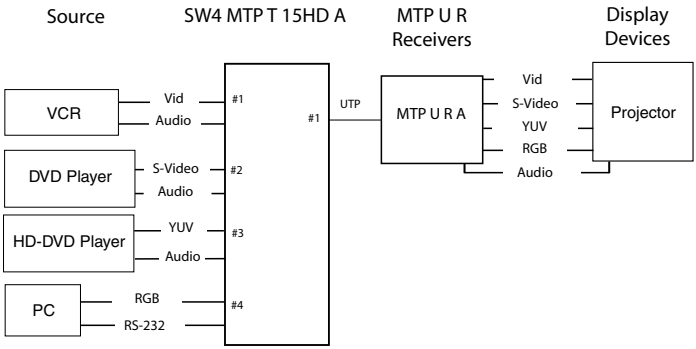


Figure 6 — MTP U R and SW4 MTP T 15HD A switcher

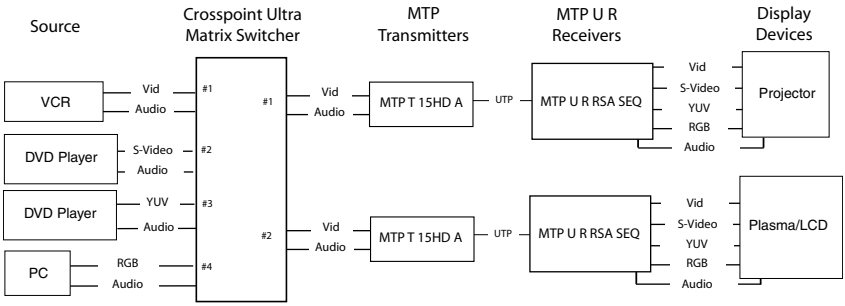


Figure 7 — MTP U R and Xpoint 450 switcher

NOTE *The MTP transmitter jumper needs to be set to tri-level for 720p and 1080i HDTV component video applications For 1080p HDTV applications set the jumper to bi-level.*

Installation

CAUTION *Installation and service must be performed by authorized personnel only.*

The 1U high, quarter rack width, MTP U R receiver can be mounted on a rack shelf, to a rack without a shelf, under a desk or tabletop, or on a projector bracket.

UL guidelines for rack mounted devices

The following Underwriters Laboratories (UL) guidelines pertain to the safe installation of the MTP U R receiver in a rack.

1. **Elevated operating ambient temperature** — If installed in a closed or multi-unit rack assembly, the operating ambient temperature of the rack environment may be greater than room ambient temperature. Therefore, install the device in an environment compatible with the maximum ambient temperature (Tma = +122 °F, +50 °C) specified by Extron.
2. **Reduced air flow** — Install the equipment in a rack so that the amount of air flow required for safe operation of the equipment is not compromised.
3. **Mechanical loading** — Mount the equipment in the rack so that a hazardous condition is not achieved due to uneven mechanical loading.
4. **Circuit overloading** — Connect the equipment to the supply circuit and consider the effect that circuit overloading might have on overcurrent protection and supply wiring. Appropriate consideration of equipment nameplate ratings should be used when addressing this concern.
5. **Reliable earthing (grounding)** — Maintain reliable grounding of rack-mounted equipment. Pay particular attention to supply connections other than direct connections to the branch circuit (e.g., use of power strips).

Rack mounting

For optional rack mounting, mount the MTP on any of the following rack shelves:

- RSF 123, VersaTools® 19" 1U rack shelf kit (part #**60-190-20**)
- RSB 123, VersaTools 19" basic 1U rack shelf (part #**60-604-21**)
- RSU 126, 6" deep 1U rack shelf kit (part #**60-190-10**)
- RSB 126, 6" deep basic 1U rack shelf (part #**60-604-11**)

- RSU 129, Standard universal 1U rack shelf kit (part #**60-190-01**)
- RSB 129, Basic universal 1U rack shelf (part #**60-604-02**)

On the standard rack shelf, the MTP U R mounts in one of four locations to the rear of the rack or in one of four locations to the front of the rack.

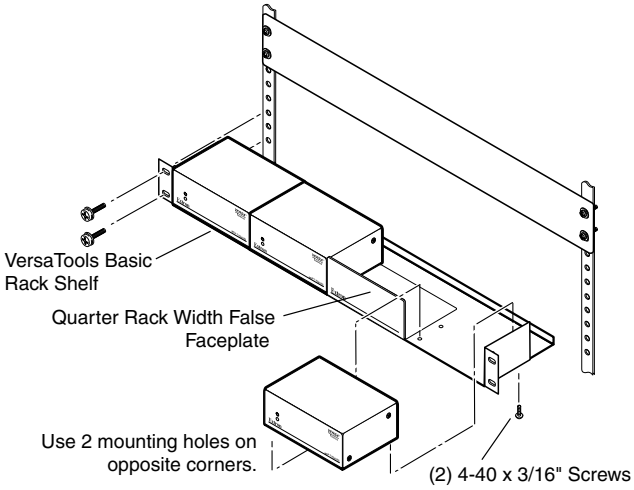


Figure 8 — Mounting the MTP on a VersaTools shelf

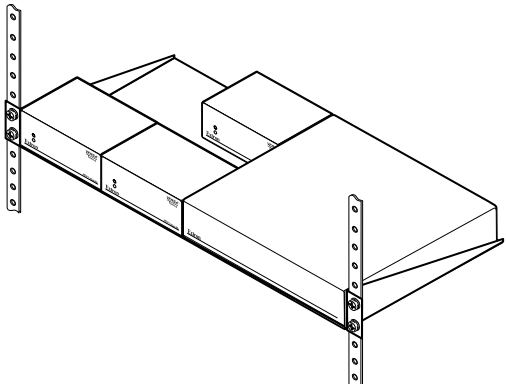


Figure 9 — Mounting the MTP on a standard shelf

1. Remove the feet from the bottom of the MTP, if they are installed.

2. Mount the MTP using two 4-40 x 3/16" screws in opposite (diagonal) corners to secure the MTP to the shelf.

NOTE *Extron recommends where more than one shelf is required, rack mount shelves are installed at least 1U apart, to allow for air flow and proper cooling between the shelves.*

3. Install false faceplate(s) or other unit(s) to the rack shelf.
4. Mount the shelf into the rack.

Back of the rack mounting

The MTP can be mounted to the rear of a rack using the Extron MBB 100, VersaTools® back of the rack mounting kit (part **#70-367-01**). The kit allows the product to be vertically mounted to the front or rear rack supports and facing either towards the front or the rear of the rack.

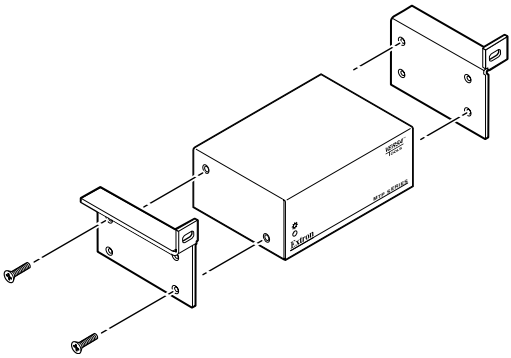


Figure 10 — Attaching the back of the rack kit

1. Remove feet from the bottom of the MTP if they are installed.
2. Remove two screws from one side of the unit. Retain the screws for possible later reassembly without the bracket.
3. Attach one bracket to the side of the unit using the longer screws included in the kit.
4. Repeat steps **2** and **3** on the other side of the unit.
5. Mount the unit to the rack using the two included rack screws (figure 11). The MTP can be vertically mounted facing in either direction.

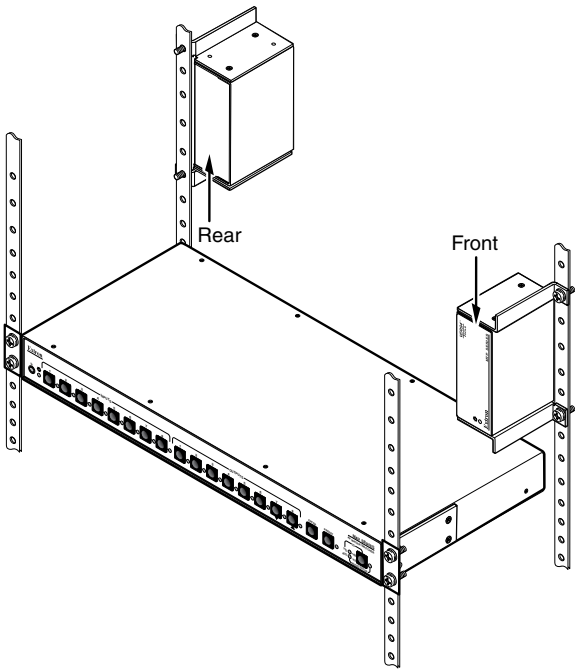


Figure 11 — Typical back of the rack installations

Furniture or projector mounting

Use the optional mounting kit (MBU 123, furniture, part #**70-212-01,** or PMK 100, projector, part #**70-217-01**) to mount the MTP as follows:

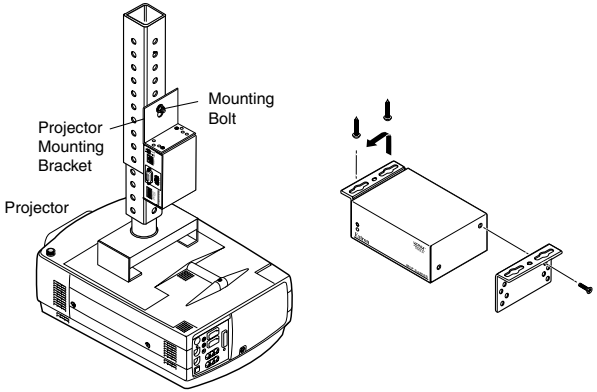


Figure 12 — Desk and projector mounting the MTPs

1. Remove the feet from the bottom of the MTP, if they are installed.
2. Attach the mounting brackets to the MTP with the machine screws provided.
3. **For furniture mounting**, hold the MTP with the attached brackets against the mounting surface. Mark the bracket screw hole locations on the mounting surface.
4. **For furniture mounting**, drill 3/32" (2 mm) diameter pilot holes, 1/4" (6.3 mm) deep in the mounting surface at the marked screw locations.
5. **For furniture mounting**, insert #8 wood screws into the four pilot holes. Tighten each screw into the mounting surface until just less than 1/4" (6 mm) of the screw head protrudes.
6. **For furniture mounting**, align the mounting screws with the slots in the brackets and place the MTP against the surface, with the screws through the bracket slots.
7. **For furniture mounting**, slide the MTP slightly forward or back, then tighten all four screws to secure the MTP in place.
8. **For projector mounting**, secure the MTP to a projector mount by inserting the mounting bolt through the bracket's slotted hole.

Connections and Settings

Rear panel connectors and features for the MTP U R series of receivers are shown below.

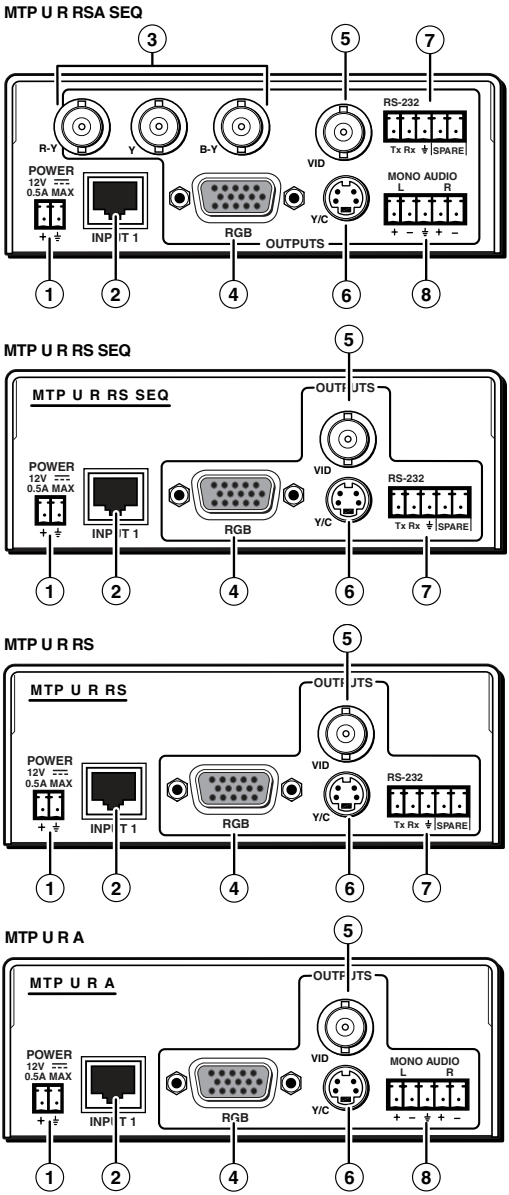


Figure 13 — Receivers' rear panel features

① **Power connector —** Plug the included external 12 VDC power supply into this 2-pole captive screw connector. See "Power supply wiring" to wire the connector.

② **Input 1 connector —** Connect one end of the cable from the transmitter.

See "TP cable termination" to wire the RJ-45 connectors.

CAUTION ***Do not*** *connect these devices to a computer data or telecommunications network.*

③ **Component video output connectors (MTP U R RSA SEQ model only) —** Connect a suitable device to these three female BNC connectors for component (Y, R-Y, and B-Y) video output.

NOTE *For MTP U R RS SEQ, MTP U R RS, and MPT U R A models, component video is output on the 15-HD VGA connector.*

Video output can be bi- or tri-level sync.

The MTP transmitter jumper needs to be set to tri-level for 720p and 1080i HDTV component video applications For 1080p HDTV applications set the jumper to bi-level.

④ **High resolution video output connector —** Connect a projector or other high resolution video device to this 15-pin HD connector for RGB output.

The pin-out for the 15-pin HD connector is as below

NOTE *Input only sync signals, no video signals, on the sync pins (13 and 14).*

For component video, use the R (R-Y) and R return pins (pins 1 and 6), G (Y) and G return pins (pins 2 and 7), and B (B-Y) and B return pins (pins 3 and 8).

The MTP U R receiver's horizontal and vertical sync output is negative by default. To change the polarity, reset the jumper position on JMP 2 and JMP 3.

⑤ **Composite video output connector —** Connect an appropriate display device to this female BNC connector for composite video output.

⑥ **S-video output connector —** Connect an appropriate display device to this 4-pin mini DIN connector for S-video output.

NOTE *Only one of the above video connectors (③ through ⑥) can be active at a time. The MTP U R device auto detects the signal format and outputs it on the appropriate connector. The other connectors are muted.*

⑦ **RS-232 connector —** Connect a serial communications port to this 3.5 mm, 5-pole captive screw connector for bidirectional RS-232 communication. Wire the connector as shown below.

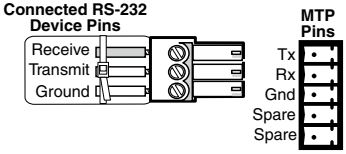


Figure 14 — Pin assignments for RS-232 wiring

NOTE

To set the connector for unidirectional communication, see "Setting JMP1 for RS-232 communication".

Set up the receiver for unidirectional communication when it is to be used with an MTP DA to avoid any RS-232/Audio detection issues.

When with an MTPX Matrix Switcher, set up the receiver for unidirectional for transmitter to receiver communication; otherwise it should be set to bidirectional when using the RS-232 output insert connections on the matrix.

⑧ **Audio connector (MTP U R RSA SEQ and MTP U R A models only) —** Connect a suitable audio device to this 5-pole captive screw connector for mono audio output.

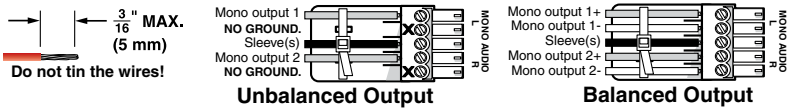


Figure 15 — Audio connector wiring

Power supply wiring

NOTE *This product is intended to be supplied by a UL Listed power supply and output rated at 12 VDC, 2A.*

Wire the supplied male power connector (plug) as in figure 16.

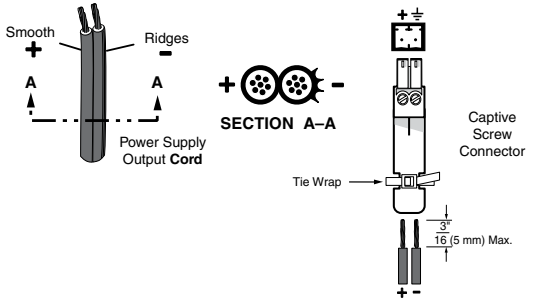


Figure 16 — Power connector wiring

CAUTION *Power supply voltage polarity is critical. Incorrect voltage polarity can damage the power supply and the product. Identify the power cord negative lead by the ridges on the side of the cord.*

NOTE *The length of the exposed (stripped) copper wires is important. **The ideal length is 3/16″ (5 mm)**. Longer bare wires can short together. Shorter wires are not as secure in the captive screw connectors and could be pulled out.*

Do not tin the stripped power supply leads before installing the captive screw connector. Tinned wires are not as secure in the captive screw connectors and could be pulled out.

To verify the polarity before connection, plug in the power supply with no load and check the output with a voltmeter.

WARNING *The two power cord wires must be kept separate while the power supply is plugged in. Remove power before wiring.*

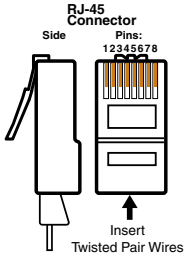
As an alternative, an Extron P/S 123 Universal 12 VDC Power Supply, part **#60-814-01**, can power multiple MTPs or other Extron 12 VDC devices using only one AC power connector.

Insert the wired plug into the power connector on the rear panel.

TP cable termination

NOTE *RJ-45 termination must comply with TIA/EIA T 568A or TIA/EIA T 568B wiring standards for all connections.*

Figure 17 details the recommended termination of TP cables with RJ-45 connectors in accordance with the TIA/EIA T 568A or TIA/EIA T 568B wiring standards. Either standard can be used with CAT 5/5e/6 cable, but ensure that the same standard is used on both ends of the cable.



Pin	T568A Wire color	T568B Wire color
1	White-green	White-orange
2	Green	Orange
3	White-orange	White-green
4	Blue	Blue
5	White-blue	White-blue
6	Orange	Green
7	White-brown	White-brown
8	Brown	Brown

NOTE *If you are using Enhanced Skew-Free™ A/V cable, use the TIA/EIA T568A standard only.*

Figure 17 — TP cable termination

NOTE *Enhanced Skew-free A/V cable is **not recommended** for Ethernet/LAN applications.*

DO NOT connect the input RJ-45 to LAN, Ethernet, outside plant communications, or any telecommunications networks.

NOTE *This cable is specially designed for compatibility with Extron's Twisted Pair products that are wired using the TIA/EIA 568 A standard.*

The table below shows the MTP pin assignments for audio, video, and RS-232 transmission using Extron MTP standards for MTP transceivers.

Pin	RGBHV	RGBS	Component	S-Video	Composite
1	Red/V sync +	Red +	R-Y +	C +	No Signal
2	Red/V sync -	Red -	R-Y -	C -	No Signal
3	Mono Audio or RS-232 +	Mono Audio or RS-232 +	Mono Audio or RS-232 +	Mono Audio or RS-232 +	Mono Audio or RS-232 +
4	Green +	Green +	Y +	L +	Video +
5	Green -	Green -	Y -	L -	Video -
6	Mono Audio or RS-232 -	Mono Audio or RS-232 -	Mono Audio or RS-232 -	Mono Audio or RS-232 -	Mono Audio or RS-232 -
7	Blue/H Sync +	Blue/C Sync +	B-Y +	No Signal	No Signal
8	Blue/H Sync -	Blue/C Sync -	B- Y -	No Signal	No Signal

Figure 18 — MTP pin assignments

Front Panel Controls and Indicators

Front panel features on the MTP U R receivers are shown below.

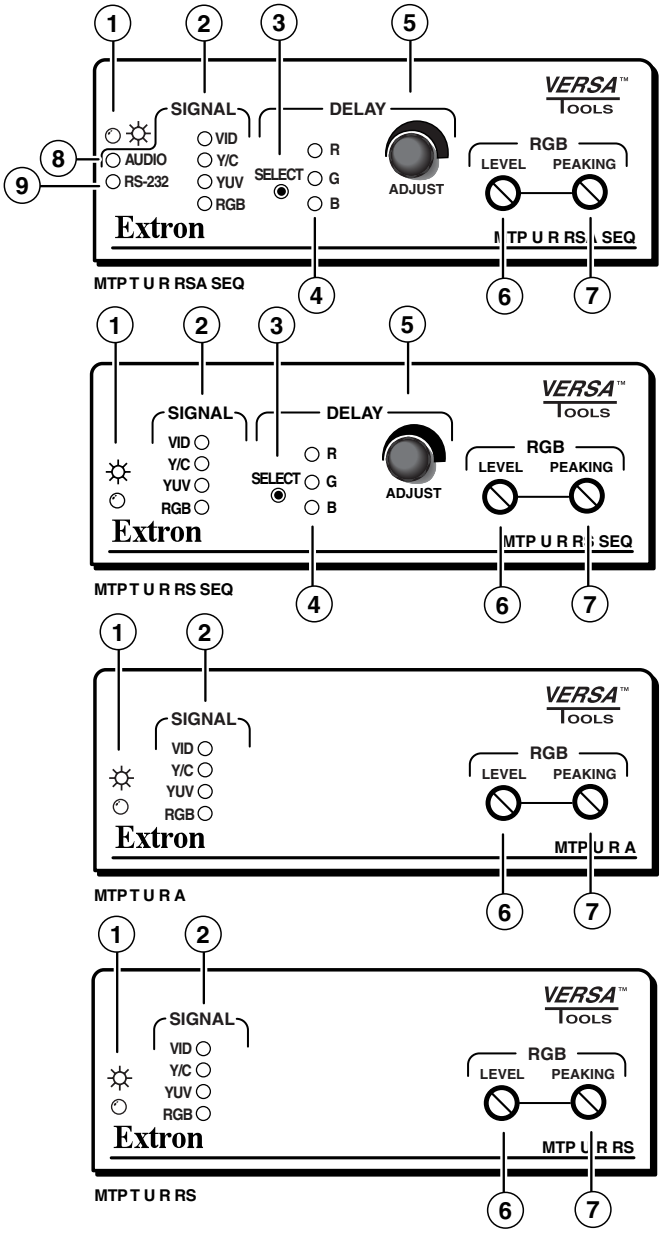


Figure 19 — MTP U R series front panels

① **Power LED —** Indicates power is applied to the MTP.

② **Signal LEDs —** The appropriate LED lights when its signal type is present and auto-detected. The signal types indicated are either composite video, Y/C, YUV, or RGB.

③ **Select button (SEQ models only) —** This recessed button selects the red, green, or blue video signal to adjust and resets all three video signals to a skew delay of zero nanoseconds.

Use a Tweeker to press and release this button to cycle and select the red, green, or blue video signal to adjust. The selected signal is indicated by the Red, Green, and Blue LEDs (④).

NOTE *The SEQ receiver automatically saves the setting for the video signal that is being deselected when this button is pushed or when the selection times out after 10 seconds.*

Press and **hold** *this button for approximately 3 seconds to zero the skew delay for red, green, and blue. The Red, Green, and Blue LEDS (④) all turn off. Release the button.*

④ **R(ed), G(reen), and B(lue) LEDs (SEQ models only) —** These indicate the video signal that is selected by the Select button (③) for skew adjustment using the Adjust control (⑤). The LED for the selected color flashes as the adjustment is made.

⑤ **Adjust skew control (SEQ models only) —** This control delays the selected red, green, or blue video signal by up to a maximum of 62 nanoseconds (ns), in 2 ns incremental steps. Rotate the control counterclockwise to reduce the delay or clockwise to increase the delay. See "Skew Delay Compensation" for details.

NOTE *The Adjust control's movement is smooth; it does not have mechanical steps or high- and low-limit stops.*

Watch the displayed image to observe the steps of delay.

For best performance the skew of the most delayed signal should be set to 0 ns (min) and the other two signals adjusted to meet it.

⑥ **Level control** — The Level control alters the video output voltage to affect the brightness of the displayed image. Adjust the knob while viewing the displayed image to set the level/boost that provides the best picture quality. See "Peaking and Level Adjustment" section for details.

⑦ **Peaking control** — Peaking affects the sharpness of a picture. Increased peaking can compensate for mid- and high-frequency detail loss from low bandwidth system components or capacitance in long cables. The minimum setting (at the counterclockwise limit) provides no peaking.

The maximum setting (at the clockwise limit) provides 100% peaking. Adjust this control while viewing the displayed image to obtain the optimum picture sharpness. See "Peaking and Level Adjustment" section below for details.

NOTE *To avoid possible video loss due to errors in the video format detection, the user should always start with minimal peaking and level, then only increase values as required.*

⑧ **Audio LED (MTP U R RSA SEQ models only) —** This LED lights in audio mode by default. The audio signal present is output on the rear panel captive screw connector.

⑨ **RS-232 LED (MTP U R RSA SEQ models only) —** This LED lights when connected to an RS-232 transmitter. The signal is output on the rear panel captive screw connector. The receiver auto-detects the RS-232 signal on pair 3 and 6 of the twisted pair.

NOTE *Only one signal type at a time is output, either audio or RS-232. The lit LED indicates the signal being output.*

Set up the receiver for unidirectional communication when it is to be used with an MTP DA to avoid any RS-232/Audio detection issues.

When with an MTPX Matrix Switcher, set up the receiver for unidirectional for transmitter to receiver communication; otherwise it should be set to bidirectional when using the RS-232 output insert connections on the matrix.

Peaking and Level Adjustment

For best performance and video format detection, the equalization of the MTP U R should be adjusted properly.

To achieve this do the following:

1. Terminate the **green** video signal output with a 75 ohm resistance, and measure the video signal.

NOTE *Gain adjustment should be set so that a white field video signal is +0.7 volts from the ground level.*

Peaking adjustment should be set using the highest frequency video format signal for the system in RGB, Component, or S-Video.

2. Using an alternative black/white pattern, adjust the peaking so that the video signal matches that of the white field video. This equalizes both the low frequency (white field) and the high frequency (alternating black/white field) to the same video level for best results.
Do not over-peak the signal.

NOTE *Since this product differs from the standard MTP receiver by its ability to auto detect the video format received, based on the video signal quality, it requires a reasonable adjusted signal for both level and peaking. There is some margin for over peaking, but if too much over peaking occurs the signal may not be recognized due to signal loss.*

Skew Delay Compensation

CAT 5/5e/6 TP cable can lead to registration errors between the red, green, and blue video signals. Pair skew can be measured with test equipment or identified by viewing a crosshatch test pattern with a critical eye to determine if either the red, green, or blue video image leads (appears to the left of) the other two video images.

NOTE *Unless the TP cable is changed, the skew adjustment should only need to be made once, during installation.*

SEQ receiver skew compensation

The SEQ receivers have built-in skew compensation capabilities. Adjust the equalization as follows:

1. **Zero the skew delay** for red, green, and blue as follows:
   a. Use a Tweeker or other small screwdriver to press and **hold** the Select button for 3 seconds. The Red, Green, and Blue LEDS all go out.
   b. Release the Select button.
2. Use UTP cable test equipment or examine the displayed video image with a critical eye to **determine which video signal**, red, green, or blue, **is shifted furthest to the right**.

NOTE *A crosshatch test pattern or a black background with vertical white lines is ideal for determining skew.*

3. **Adjust the furthest left video signal** as follows:

NOTE *The SEQ receiver **cannot** shift the furthest right video image to the left.*

   a. Use a Tweeker or other small screwdriver to press and release the Select button until the LED for the left-shifted color; Red, Green, or Blue; lights.
   b. ***Slowly*** rotate the Adjust control clockwise while monitoring the display. Continue to rotate the control until that color is properly converged.

NOTE *A 2-nanosecond (ns) adjustment is very fine. Up to 10 ns of delay may be necessary before a change in the display is detectable. Maximum delay possible is 62 nanoseconds.*

c. Use a Tweeker or other small screwdriver to press the Select button one more time to save the most recent adjustment or allow the 10-second timeout to elapse.

4. If the remaining color is left shifted, repeat step **3**.

Non-SEQ receivers skew compensation

Try using the following methods to minimize or eliminate pair skew:

- Switch to Extron's Enhanced Skew-Free A/V UTP cable.
- Add a skew compensation cable equal to the length of pair skew to the receiver's output.
- Install an SEQ 100 15HD Skew Equalizer on the receiver's video output and adjust the skew for the leading video image.

Specifications

Video

Gain	Unity

Video input

Number/signal type	1 set of proprietary analog signals
Connectors	1 female RJ-45

Video output

Number/signal type	1 RGBHV, RGBS, component video (bi-level and tri-level), S-video, composite video (always input type)
Connectors	
MTP U R RSA SEQ	1 female 15-pin HD for RGB 3 BNC female for Y, R-Y, B-Y (1) 4-pin mini DIN for S-video (Y/C) 1 BNC female for composite video
Other models	1 female 15-pin HD for RGB or Y, R-Y, B-Y (1) 4-pin mini DIN for S-video (Y/C) 1 BNC female for composite video
Nominal level	1 Vp-p for Y of component video and S-video, and for composite video 0.7 Vp-p for RGB 0.3 Vp-p for R-Y and B-Y of component video and for C of S-video
Minimum/maximum levels	0.8 V to 1.2 Vp-p
Impedance	75 ohms (during video output only)
Return loss	<-30 dB @ 5 MHz (during video output only)
DC offset	<±20 mV with input at 0 offset

Sync

Output type	RGBHV, RGBS
Standards	NTSC 3.58, NTSC 4.43, PAL, SECAM
Output level	4.0 V to 5.0 Vp-p, unterminated
Output impedance	87 ohms (24 mA)
Polarity	Positive or negative (selectable)

Audio — MTP U R RSA SEQ, MTP U R A

Gain	Unbalanced output: 0 dB; balanced output: +6 dB
Frequency response	20 Hz to 20 kHz, ±1 dB

THD + Noise	0.15% @ 1 kHz, 0.3% @ 20 kHz at nominal level
S/N	>70 dB at maximum output (unweighted)

Audio input — MTP U R RSA SEQ, MTP U R A — See MTP Series transmitters' audio output specifications

Number/signal type	1 set of proprietary analog signals
Connectors	1 female RJ-45

NOTE *0 dBu = 0.775 Vrms, 0 dBV = 1 Vrms, 0 dBV 2 dBu*

Audio output — MTP U R RSA SEQ, MTP U R A

Number/signal type	2 mono, balanced/unbalanced
Connectors	(1) 3.5 mm captive screw connector, 5 pole
Impedance	50 ohms unbalanced, 100 ohms balanced
Gain error	±1 dB channel to channel

Control/remote — external device (pass-through, unidirectional or bidirectional) (MTP U R RSA SEQ, MTP U R RS SEQ, or MTP U R RS)

Serial control port input/output.	RS-232 via (1) 3.5 mm, 3 pole captive screw connector

NOTE *The serial communications link of an MTP U R RSA SEQ, MTP U R RS SEQ, or MTP U R RS is bi-directional (default), unless the receiver's jumper JMP 1 is set to uni-directional.*

Set up the receiver for uni-directional communication when it is to be used with an MTP DA to avoid any RS-232/Audio detection issues.

When with an MTPX Matrix Switcher, set up the receiver for uni-directional for transmitter to receiver communication; otherwise it should be set to bi-directional when using the RS-232 output insert connections on the matrix.

Baud rates	Up to 38400 bps at up to 600' (152 m) (Higher data rates and distances are possible. Performance will vary based on baud rate and cable length.)
Protocol	Data bits = 5 - 8 Stop bits = 1 or 2 Parity = odd, even, none Flow control = XON, XOFF, none

NOTE *Protocol is mirrored between the transmitter and the receiver.*

Serial control pin configurations.	Captive screw connectors: 1 = TX, 2 = RX, 3 = GND

General

External power supply	100 VAC to 240 VAC, 50/60 Hz, external, autoswitchable; to 12 VDC, 2 A, regulated
Power input requirements	12 VDC, 0.5 A
emperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Cooling	Convection, unvented
Rack mount	Yes, with optional 1U rack shelf, part #60-190-01 or 60-604-02; or VersaTools® rack shelf, part #60-190-20 or 60-604-21 Also furniture mountable with optional Mini Under-Desk Mounting Kit, part #70-212-01; or projector mountable with optional projector mounting kit, part #70-217-01
Enclosure type	Metal
Enclosure dimensions	1.7" H x 4.3" W x 3.0" D (1U high, quarter rack wide) 4.3 cm H x 10.9 cm W x 7.6 cm D (Depth excludes connectors.)
Product weight	0.6 lbs (0.3 kg)
Shipping weight	2 lbs (1 kg)
Vibration	ISTA 1A in carton (International Safe Transit Association)
Listings	UL, CUL
Compliances	CE, FCC Class A, VCCI, AS/NZS, ICES
MTBF	30,000 hours
Warranty	3 years parts and labor

NOTE *All nominal levels are at ±10%.*

NOTE *Specifications are subject to change without notice.*

Part Numbers

MTP receivers

Receiver	Part number
MTP U R RSA SEQ receiver	60-869-01
MTP U R RS SEQ receiver	60-869-02
MTP U R A receiver	60-869-03
MTP U R RS receiver	60-869-04

Accessories

Accessories	Part number
P/S 123 Multiple output 12 V power supply	60-814-01
19" 1U Universal Rack Shelf	60-190-01
19" 1U Basic Rack Shelf	60-604-02
VersaTools universal rack shelf	60-190-20
VersaTools basic rack shelf	60-604-21
VersaTools back of the rack mounting kit	70-367-01
VersaTools furniture mounting kit	70-212-01
VersaTools projector mounting kit	70-217-01

Cables/connectors

NOTE *Enhanced Skew-Free™ A/V UTP cables are not recommended for Ethernet/LAN applications.*

Enhanced Skew-Free™ A/V cable	Part number
Enhanced Skew-Free A/V cable (cut, various lengths)	26-569-xx
Enhanced Skew-Free A/V 1000' (Bulk) (non-plenum)	22-141-03
Plenum enhanced Skew-Free A/V 1000′ (Bulk)	22-142-03

RJ-45 connector	Part number
CAT 6 jack (black)	100-476-01
CAT 6 jack (red)	100-477-01
CAT 6 jack (blue)	100-478-01
CAT 6 jack (orange)	100-479-01
CAT 6 jack (gray)	100-480-01
CAT 6 jack (white)	100-481-01
CAT 6 jack (ivory)	100-482-01

Extron's Warranty

Extron Electronics warrants this product against defects in materials and workmanship for a period of three years from the date of purchase. In the event of malfunction during the warranty period attributable directly to faulty workmanship and/or materials, Extron Electronics will, at its option, repair or replace said products or components, to whatever extent it shall deem necessary to restore said product to proper operating condition, provided that it is returned within the warranty period, with proof of purchase and description of malfunction to:

USA, Canada, South America, and Central America:

Extron Electronics
1001 East Ball Road
Anaheim, CA 92805, USA

Europe, Africa, and the Middle East:

Extron Electronics, Europe
Beeldschermweg 6C
3821 AH Amersfoort
The Netherlands

Asia:
Extron Electronics, Asia
135 Joo Seng Road, #04-01
PM Industrial Bldg.
Singapore 368363

Japan:
Extron Electronics, Japan
Kyodo Building
16 Ichibancho
Chiyoda-ku, Tokyo 102-0082
Japan

This Limited Warranty does not apply if the fault has been caused by misuse, improper handling care, electrical or mechanical abuse, abnormal operating conditions or non-Extron authorized modification to the product.

If it has been determined that the product is defective, please call Extron and ask for an Applications Engineer at (714) 491-1500 (USA), 31.33.453.4040 (Europe), 65.6383.4400 (Asia), or 81.3.3511.7655 (Japan) to receive an RA# (Return Authorization number). This will begin the repair process as quickly as possible.

Units must be returned insured, with shipping charges prepaid. If not insured, you assume the risk of loss or damage during shipment. Returned units must include the serial number and a description of the problem, as well as the name of the person to contact in case there are any questions.

Extron Electronics makes no further warranties either expressed or implied with respect to the product and its quality, performance, merchantability, or fitness for any particular use. In no event will Extron Electronics be liable for direct, indirect, or consequential damages resulting from any defect in this product even if Extron Electronics has been advised of such damage.

Please note that laws vary from state to state and country to country, and that some provisions of this warranty may not apply to you.

Extron **USA - West**
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